

Solid State Inflation Balloon Active Deorbiter

Completed Technology Project (2015 - 2017)



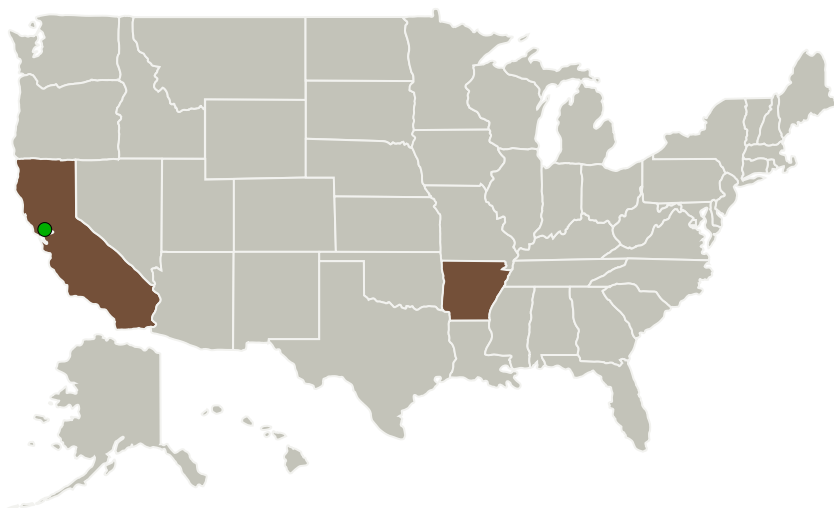
Project Introduction

The Solid State Inflation Balloon (SSIB) is a simple, reliable, low-cost, non-propulsive system for deliberate deorbit and control of downrange point-of-impact that is compatible with a full range of smallsats from 1kg to 180kg in mass, and includes built-in redundancy for enhanced reliability and safety. The gas generator contains a MEMS Solid-State Gas Generator chip and scalable array of microwells with precisely filled quantities of sodium azide. Integrated heaters decompose this into nitrogen gas to inflate a metalized polyimide balloon, allowing interactions with solar radiation pressure and the upper atmosphere to provide deorbiting drag. The total mass of the SSGG is expected to be ~10 grams, while the power consumption of the heater is ~10mW (for sequential operations of one well at a time).

Anticipated Benefits

The successful development of the SSIB provides NASA a low cost technology for end-of-life or sample-return deorbit and control of downrange point-of-impact. It is compatible with a full range of masses from 1kg to 180kg, from CubeSats to MicroSats,.

Primary U.S. Work Locations and Key Partners



Solid State Inflation Balloon
Active Deorbiter

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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

University of Arkansas

Responsible Program:

Small Spacecraft Technology

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Organizations Performing Work	Role	Type	Location
University of Arkansas	Lead Organization	Academia Alaska Native and Native Hawaiian Serving Institutions (ANNH)	Fayetteville, Arkansas
● Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations

Arkansas	California
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Project Transitions

**October 2015:** Project Start**October 2017:** Closed out

Closeout Summary: The project demonstrated balloon inflation to ~0.6 m in vacuum chamber environment. The scalability of the design easily allows future achievement of targeted balloon volume by enlarging the microwell size.

Project Website:

<https://www.nasa.gov/directorates/spacetech/home/index.html>

Project Management

Program Director:

Christopher E Baker

Program Manager:

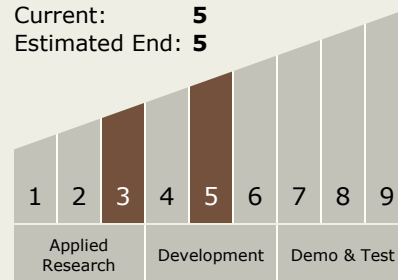
Roger Hunter

Principal Investigator:

Po-hao A Huang

Technology Maturity (TRL)

Start: **3**
Current: **5**
Estimated End: **5**



Target Destination

Earth